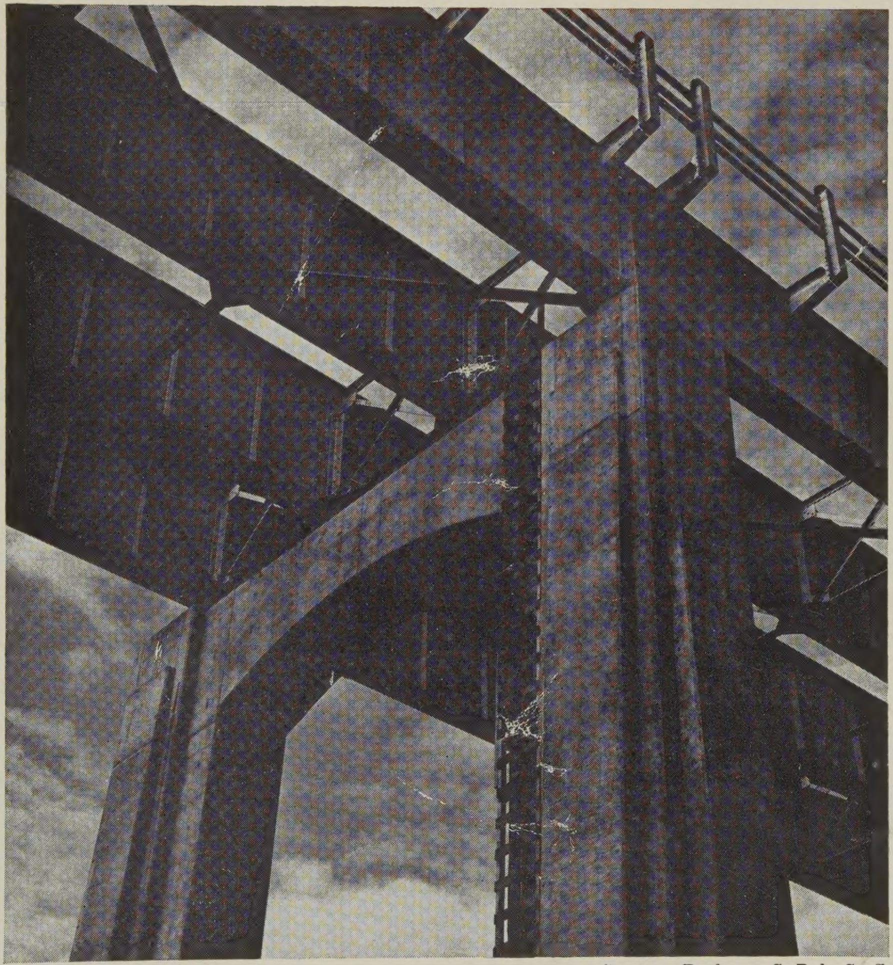
SOCIETY OF PROFESSIONAL ENGINEERS ILLINOIS FOUNDED 1886

the ILLINOIS ENGINEER

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS FOUNDED 1934



Courtesy Professor C. Dale Greffe

STRUCTURAL DYNAMICS

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THE ILLINOIS ENGINEER, APRIL, 1955—VOLUME XXXI, NO. 4

Address all communications to the Society at 614 East Green St., Champaign, Illinois.

ILLINOIS SOCIETY OF PROFESSIONAL ENGINEERS, Incorporated

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Of Interest to I. S. P. E.

THE ILLINOIS ENGINEER—THIS MONTH

Annual Report of the Editor of the Illinois Engineer

W. A. OLIVER

The fundamental functions of the Society's publication do not change from year to year so that this report is to a large extent a repetition of what has been said in various ways in the past. Furthermore, the Editor reports twelve times a year, in every issue of the magazine. However, it is a good thing to restate principles and policies from time to time and that is the principal excuse for an annual report.

The primary purposes of our publication are (1) to keep the membership informed concerning society business and progress and (2) to keep them informed concerning the thinking and activity going on in the engineering profession at all levels—local, state, and national. We purpose to do this within the limits of the budgeted amount allowed us by the Board of Direction.

Since the Illinois Society of Professional Engineers is a professional organization, in addition to items of interest concerning current events in the Society, the pages of its publication should be devoted primarily to articles and papers dealing with professional matters. This has been done. On the other hand, technical papers are always of interest and we continue to encourage their submission for publication in the ILLINOIS ENGINEER.

A few figures concerning magazine costs should always be presented in the Editor's report. Of course we kept within our budget during the past year. That should be understood without stating. The total gross cost of the magazine was $3705.18. The income from advertising was $1797.29, so that the net cost was $1907.89. Assuming an average membership of 1750, the unit net cost of the magazine was approximately $1.09 per member for the year. The income from advertising was $146.36 more in 1954 than it was in 1953.

At this point mention should be made of the fine work done by this year's Advertising Committee under the chairmanship of Mr. Kenneth E. Welton of Lake County Chapter. In addition to obtaining some additional advertising for the magazine, Mr. Welton and his committee made a survey and breakdown of the functional activities of society membership. The results of this survey have been printed in the form of a leaflet and has been and is being used in obtaining advertising. It was printed in the November, 1954 issue of the magazine so that you have a copy of this interesting survey available for your study and use.

We still urge the chapters to send in news items for inclusion in the magazine. The appointment of Associate Chapter Editors to perform this duty has been proposed. This is of course an excellent idea but the membership as a whole should keep the magazine in mind and function in this way. Some chapters do very well, others not

(Continued on page 2)

NATIONAL ENGINEERS' WEEK

(Prepared by P. E. ROBERTS)

National Engineers' Week was celebrated by Illinois Society Chapters in 1955 by increasing numbers and wider interests.

Lake County Chapter again sponsored and produced an eight-page engineering section in the Waukegan *News-Sun* on Monday, February 21. Lake County Chapter's other activities included furnishing speakers to business lunch clubs and a joint meeting with a Chamber of Commerce group.

Joliet Chapter sponsored and produced a three-page engineering section in the Joliet *Herald-News* on Monday, February 21. The Chapter also participated in a Washington's Birthday Dinner on February 22. During Engineers' Weeks there were two fifteen-minute local radio station broadcasts and spot announcements each day of the week. At the regular Chapter Meeting on February 24, members of the Junior College Engineers' Club were guests of the chapter.

Champaign County Chapter, through the able assistance of Jack Roberts, produced a half-hour panel discussion show over WCIA-TV. Jack was moderator of the show and the members of the panel were Dean William L. Everitt, H. E. Hudson, Jr., John Kearns, and Vail Moore. The group discussed the educational, civil, water resources, and general aspects of engineering. The show was very professionally done and a credit to those who worked it up. On Thursday, February 24, a dinner-dance was held at the Champaign County Country Club under the co-chairmanship of C. Ray Carroll and Edward Healey. One hundred and forty attended.

Central Illinois Chapter sponsored a TV show on their local station. Rock River Chapter promoted window displays and a special Engineers' Week dinner meeting. DuKane Chapter used window displays and posters. Other chapters participated in various ways in celebrating 1955 National Engineers' Week. Much of the credit for stimulating interest should be given to Publicity Chairman Rob Roy.

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SUBSCRIPTION RATES

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EDITOR'S ANNUAL REPORT

(Continued from page 1)

so well. All chapters should do their share. It is one important indication of interest and activity in society affairs.

In closing we want to remind you that this is our swan song and to thank you for your continuous and continuing interest and cooperation in the preparation of our magazine. We hope that you will give the new Editor the same encouragement and support. The magazine is still far from the saturation point in the number of articles and pictures that can be used and we hope that you will continue to submit them and in increasing numbers. The magazine is a proper outlet for the expression of your criticisms, good or bad, concerning society business and policies and you should continue to make use of it for that purpose and in any other way that the publication can serve you in the dissemination of information to the Society as a whole.

I. S. P. E. LEGISLATIVE BANQUET

Contact your Chapter president for tickets to the third I.S.P.E. Legislative Banquet which will be held at the Elks Club in Springfield on Tuesday, May 17, 1955. If he has sold all of his tickets, more can be obtained by writing to the ticket chairman, Don S. Magowan, P. O. Box 111, Springfield, Illinois.

Attendance at the first banquet four years ago was approximately 130. Two years ago this increased to 320. This year it is hoped to have over 400 present and that *you* will be one of the 400. A full evening is promised for $3.50, including a cocktail hour, banquet and high-class entertainment furnished by the Division of Sanitary Engineers.

Be hosts for your State Senator and your local Representatives. Help to honor our Engineer Legislators and at the same time promote a feeling of good will between our profession and our law-makers. Let's have all 16 chapters represented on this night. See you May 17th!

Leslie F. Ryburn
General Chairman

COVER PICTURE

When finished, the bridge will fill a long existent need at Beardstown, Illinois. Unlike the bridges at Florence and LaSalle, this bridge is high enough to permit all river traffic to pass without a lift section. This picture, made by Professor C. Dale Greffe of Champaign County Chapter, shows one of the many pictorial possibilities while construction was in progress.

Report of the National Director

N. S. P. E. BOARD MEETING, CHARLOTTE, N. C., FEBRUARY 18, 1955

George De Ment, National Director

Charlotte, N. C. was the location of the N.S.P.E. Spring Meeting, held February 18th and 19th. The meeting was held in conjunction with the Annual Winter Meeting of the Professional Engineers of North Carolina.

President Clarence Shoch presided at the meetings. President Shoch is a quiet, soft-spoken individual who conducts meetings in a manner that keeps the activity moving on an even keel and gets much accomplished during the meetings. President Shoch is another in the line of exceptionally well-qualified men who have presided over our Society.

The growing enthusiasm of all Committee Chairmen who reported at this meeting is encouragement to all engineers who are looking for a true professional concept to be developed by N.S.P.E.

Through our committee activities we can take pride in the growth in stature of the National Society which has taken place during the past year. Management, Government and Business are all recognizing the engineer for what he is striving to be—a PROFESSIONAL.

One of the most interesting committee reports was made by Anatole Greuhr, who is Chairman of Engineers' Week. The use of Engineers' Week for promoting professional concept of engineers is being accepted more and more by various diversified fields of our national economy. All segments of our Society are proclaiming Engineers' Week with its challenging title this year of "ENGINEERING—Builder of a Brighter Future."

At the time this report is published, Engineers' Week will have passed and its value will be known throughout the country. However, prior to Engineers' Week there had been three times as much material requested and distributed by the Society than the previous year.

It should be noted that letters were sent to industry, publishers, radio and TV executives, as well as to the engineering colleges, calling attention to Engineers' Week. Of unusual interest in this regard is the caliber of men who allowed their names to be listed as sponsors of Engineers' Week on the letterheads sent from our national headquarters, and it is worth the space to list the names of the men and their connections.

Vandever Bush, President
Carnegie Institute of Washington
Charles F. Kettering
General Motors Corporation
Thomas E. Murray, Commissioner
U. S. Atomic Energy Commission
Philip Sporn, President
American Gas & Electric Company
Robert E. Wilson
Chairman of the Board
Standard Oil Company of Indiana
Allen B. DuMont, President

Allen B. DuMont Laboratories, Inc.
Clarence H. Linder, Vice-President
General Electric Company
Royal W. Sorenson
California Institute of Technology
David B. Steinman
Consulting Engineer

A letter requesting cooperation was also sent to 2200 members of the American Association of Advertising Agencies. Many letters were received from these agencies indicating a desire to cooperate in Engineers' Week. In addition, 1200 copies of the National Engineers' Week Promotional Kit were distributed to the State Societies and to the Local Chapters for their use. Complete coverage of the result of Engineers' Week will be given in the April issue of the *American Engineer*.

The *Chapter Activities Committee* has prepared and distributed the first issue of the Chapter Activities Guide entitled "HELPING THE YOUNG ENGINEER." The committee is preparing eight additional monographs covering other activities that can be used by the chapters.

The *Employment Practices Committee* recommended that the Society reaffirm its position in relation to the Taft-Hartley provisions that affect Professional Engineers. This was necessary since some of the provisions and safeguards in the Taft-Hartley Act were being attacked by new legislation. The Society concurred in the recommendations and this allows the National staff to give proper testimony when these revisions of the Taft-Hartley Act are presented to committee. The Employment Practices Committee further recommended that the Federal Classification Act be amended to require engineers in Grade XIII and above to be registered, except that present holders of Grade XIII and above shall be exempted from this requirement. The committee also recommended that the "P" (Professional) designation or some other special designation should be used for engineers in Federal Government employ so as to separate them from General Service employees and thus allow separate considerations, economic and otherwise, in order to maintain a high level of engineering services for the Government. The committee also requested that N.S.P.E. should testify in favor of the appropriate pay increases for Federal engineering employees by the presentation of facts on engineering salaries as compared to non-federal salaries. All of these recommendations were approved by the Board of Directors.

The *Committee on Engineer-In-Industry* with Robert A. Blackburn as Chairman, reported that the first phase of the Engineer-In-Industry Program had been completed with the preparation of a book entitled "A Professional Look at the Engineer-In-Industry." The distribution of this booklet should be widespread with particular stress on its availability to industrial managements. The booklet is available to members of the National Society for $1.50 each and to non-members for $3.00 each.

The *Committee on Membership* of which A. H. Kidder is the Chairman, recommended that:

> To assist State Societies in their membership promotion and delinquency prevention activities which are almost exclusively Local Chapter functions, *the National Society will refund to each eligible State Society within sixty days after the end of each calendar year, a portion of its Professional Engineer Members' current and delinquent dues payments to the National Society during the year, said portion to be equal to the amount by which 95 per cent of said State Society's dues payments during the calendar year have exceeded the corresponding dues payments during the preceding year, after adjustment only as necessary to exclude the effect of dues increases if any were paid* by members of record at the beginning of said calendar year and provided that the State Society has established its eligibility for such refund by indicating in writing to the National Society that this money will be apportioned to the *Chapters of the State Society* on the same basis where applicable.

This will provide additional money for chapter activities on a membership campaign.

A further encouragement to build up the membership in the Society is provided in the Amendment to By-Law 25 which is now amended to read as follows:

> "To be reinstated, a former member who has been dropped, must pay current dues in addition to a reinstatement fee of $2.00."

The *Publications Committee* with Vincent Waters as Chairman, gave a report of the *American Engineer* with particular emphasis on the editorial content. They also stated that the advertising income for 1954 had increased 42.8 per cent over the advertising for 1953. The committee feels that this will increase until it gains the ultimate about 1956, due to the activities of the Austin-LeStrange Company, who has been hired as our advertising representative.

There are many other committee reports of interest but I have selected those things which seemed most interesting to me. I suggest that you examine the report in the *American Engineer*, which is much more complete in regard to the various committee activities.

It was announced at the Charlotte meeting that the Awards Committee recommended and the Board of Direction approved the presenting of the Annual Award to Andre Potter, Dean Emeritus of the Enginering School at Purdue University. This award will be made to Dean Potter at the June meeting in Philadelphia.

It was announced that the salary survey which has been carried on recently will be published in April. This survey will be available to all engineers for their use in any salary discussions.

The Board of Direction authorized the National Headquarters Building Committee to proceed with the awarding of contracts for building our new headquarters. The building will likely be available for occupancy late in 1955 or early in 1956.

Let us all work toward building a brighter future for the engineering profession and for N.S.P.E. in particular.

The Recent National Engineers' Week

PARTIAL REVIEW OF I. S. P. E. ACTIVITIES

The following articles and pictures give an indication of some of the activities that were carried on throughout the state, and throughout the nation, as far as that is concerned, during National Engineers' Week, February 21 to 25, 1955. This nation-wide program sponsored by the N.S.P.E. has become an annual affair and has been growing in importance. The dignified methods which have been used in presenting the story of engineering to the public has the support of every professional engineer. The Illinois Society particularly has done itself proud with its Engineers' Week programs. Each Chapter has had a share.

W. A. OLIVER, Editor.

LEAD ARTICLE IN 8-PAGE ISSUE OF WAUKEGAN NEWS-SUN

Lake County Chapter Plays Big State Role

Move Started Here to Bring 1956 State Convention to County for First Time in History

Prepared by S. DANOFF, President
Lake County Chapter

Lake County Chapter of the Illinois Society of Professional Engineers, which is a member of the National Society of Professional Engineers, is one of the most active chapters in the state. There is a present move among the membership to have the 1956 state convention in Lake County. This will be the first time the state convention has ever been bid for in the history of the chapter.

Three members of the local chapter are chairmen of state committees. M. E. Amstutz is chairman of the state education committee; K. E. Welton, treasurer of the Lake County Chapter, heads the state advertising committee; Sidney Danoff, president of the chapter, is chairman of the resolutions committee.

Many of the other members are actively participating on state committees: W. T. Hooper, Jr., state ethics and practice committee, and the state building code committee; U. C. Neyer, legislative action committee; R. G. Kramer, who is the local representative for the State governing body, is a member of the advertising committee, and the legislative action committee; Past President I. R. Lietzke is a member of the Inter-society relations committee. Many others are on committees and the chapter is very proud of the good work performed by its membership.

The history of the Lake County Chapter is a proud one and a difficult one to maintain. Although officially receiving recognition from the State Society in 1932, its inception dates back to 1928.

In this year Henry Bleck, then the city engineer of Waukegan, called together a number of the engineers for the purpose of organizing an Engineers' Club. This group included Ben P. Thacker, local consulting engineer and surveyor; G. Y. Taylor, engineer with the Public Service Company; Ralph Lobdell, then county superintendent of highways; William Weber, engineer with the Illinois Bell Telephone Company; and other practicing engineers in this area.

From this small beginning, the chapter has grown and is now the eighth largest in the state with a membership of 92 out of a total of 17 chapters. Recognition should be given to the men who have led the group since 1932. The following were presidents: 1932, Ben P. Thacker, retired in Sarasota, Fla.; 1933, George Y. Taylor, moved to McHenry County; 1934, Henry Bleck, consulting engineer of Waukegan; 1935, M. E. Amstutz, Lake County Superintendent of Highways; 1936, S. M. Wood, retired in Florida.

In 1937, R. M. Lobdell, retired in Michigan; 1938, James Anderson III, consulting engineer, Lake Forest; 1939, R. T. Reilly, moved to Memphis, Tenn.; 1940, Andrew Klarkowski, engineer with Jenkins and Boller; 1941, C. S. Pester, now in Kankakee; 1942, M. T. Anderson, now in Elgin.

In 1943, Julius Evard, engineer, Fansteel; 1944, Frank J. Kramer, retired Chicago North Shore and Milwaukee Railroad Company; 1945, E. F. Needham, retired, American Can Company; 1946, E. A. Jaeschke, Sparta, Mich.; 1947, L. C. Domke, Superintendent of the Waukegan Waterworks; 1948, D. R. Miller, Sanitary Engineer, Ninth Naval District.

In 1949, R. L. Thacker, consulting engineer, Waukegan;; 1950, S. A. Simonson, plant engineer, Chicago Hardware Foundry; 1951, C. L. Calkins, consulting engineer, Waukegan; 1952, Cyril Drew, deceased; 1953, R. G. Kramer, City Engineer, Waukegan; 1954, I. R. Lietzke, engineer, Public Service Company; 1955, Sidney Danoff, plant engineer, Midland Industrial Finishes.

One of the outstanding members of the local chapter is Amstutz, a past president of the State Society, and now on the education committee of the National Society. Many others have given great time and effort to further the future of young engineers.

The Illinois Society joined the National group in 1934. Although it joined the same year as the National group was organized, it is not officially a charter member. The National group has grown by leaps and bounds and now has a membership of 35,000 engineers. The National Society of Professional Engineers is considered the representative of the engineering profession.

REPORT OF ROCK RIVER CHAPTER

Illinois Society of Professional Engineers

ENGINEERS' WEEK ACTIVITIES

(Prepared by HARRY H. CORDES)

The activities of Rock River Chapter of the Illinois Society of Professional Engineers in observance of Engineers' Week were conducted under the supervision of the Publicity Committee of the Chapter.

CHICAGO CHAPTER

MAYOR KENNELLY ISSUES ENGINEERS' PROCLAMATION

Left to right: Paul Robbins, Executive Secretary, National Society of Professional Engineers; Harold Sommerschield, President, Chicago Chapter, Illinois Society of Professional Engineers; Mayor Martin H. Kennelly; V. E. Gunlock, Chairman, Chicago Transit Board, and Vice-President, National Society of Professional Engineers; George L. DeMent, Commissioner of Public Works, and National Director from Illinois, National Society of Professional Engineers.

The responsibilities of the various activities were assigned to certain members of the committee. However, all committee members participated in making what we call a success of Engineers' Week. This success could not have been achieved, however, without the cooperation of the entire Chapter membership, the local merchants, newspapers, high school officials, etc.

The Committee, acting as a whole, divided the City of Dixon into sections and assigned a section to each of several subcommittees. It was their assignment to contact merchants to arrange for and assist them in creating window decorations appropriate to the observance of Engineers' Week. This was very successfully achieved and resulted in a number of very interesting window displays.

Lyle Woodyatt, in addition to his duties as Chairman of the Publicity Committee, made contacts with the Sterling and Polo High Schools, and radio and television stations. John Hawley was the "press" man and newspaper publicity was very ably handled by him. The plans and arrangements for the stag dinner were made under the supervision of Chester Clausen, Vice President of the Chapter. The participation of the Dixon High School in the observance of Engineers' Week was organized and supervised by Harry H. Cordes.

The office of C. K. Willett Consulting Engineers revealed some of the many problems in various phases of engineering with which a consulting engineering firm is faced. They saw how road and street plans are prepared; they were told some of the problems that must be solved in the design of water supply and sewerage systems; they had a slight introduction to what is involved in preparing a set of bridge plans before construction can begin; they also spent a little time in the testing laboratory; and finally watched the operation of the printing machine where copies of the original plan are reproduced on paper, cloth and film by the ammonia vapor process. The portion of allotted time remaining was used to show the boys a portion of a film on the development of electrical engineering and its products, past and what may be expected in the future. Unfortunately, time did not allow the showing of the entire film.

Reports from the high school were that the main topic of discussion among the boys the following day was the tour they had taken—which makes us feel it was very worthwhile.

A copy of the program for the conducted tour is attached. Attached is also a summary prepared by the writer for a high school student who was to prepare a term paper on engineering. It will be interesting to read his paper and I have requested a copy.

CENTRAL ILLINOIS CHAPTER

In "Decatur Advertiser"

National Engineers' Week

Experts Say Atomic Submarine Great American Engineering Achievement

"An undersea vessel powered by the forces released in the breaking apart of the basic matter of the universe."

That, in a nutshell, describes the U.S.S. *Nautilus,* the world's first atomic-powered submarine.

As the nation's approximately 400,000 engineers prepare to observe National Engineers' Week, February 20-26, they are pointing to the construction of the *Nautilus* as one of the greatest American engineering accomplishments of the post-war era.

Engineers who worked on the plans for the vessel call it a "triumph over the impossible." Her whole design was such a departure from traditional submarine construction that engineers were faced with unique problems of method and material.

One of the biggest problems was to design a nuclear reactor small enough to fit into the submarine. It was first proposed to build a large working model of such a reactor that could later be scaled down to the right size. When it was realized that the "scaling down" might add as much as several years to the construction time, this step was abandoned in favor of building a nuclear reactor to size in the first place.

Once this hurdle of the reactor or "atomic power plant" was overcome, the way was paved for the sucessful design of other nuclear-powered vessels. One of these, the *Sea Wolf,* the world's second atomically-driven submarine, is now nearing completion.

The *Nautilus,* built at a cost of about 55 million dollars, is 300 feet long, weighs 2,800 tons, and can travel under water for as long as 50 days at high speed without refueling. Her top speed is more than 50 per cent faster than that of the conventional type submarine. She can dive far and cruise far below the 500 feet maximum submersion depth of other U. S. submarines.

With her thick steel hull, oxygen-making equipment, and many electronic devices, the *Nautilus* will give her crew every possible safety protection.

To build these standards of performance and safety into the *Nautilus,* engineers had to develop an elaborate testing program covering the material, machinery and instruments. For example, no one really knew if the special metal alloys needed would hold up under the operating conditions. So naval engineers had miniature submarines made up and then loaded them with scale models of the equipment to be used on the *Nautilus.*

Rear Admiral Hyman G. Rickover, the determined Naval engineer who was the man most responsible for the building of the *Nautilus,* once told a group of scientists that "the atomic-powered submarine is 90 per cent engineering and only 10 per cent physics."

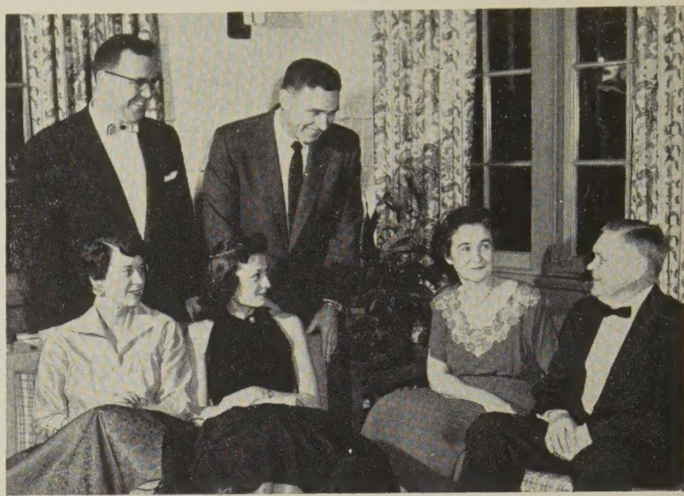
Today engineers believe we have only scratched the surface, so to speak, of what can really be done through science and technology. The famous Einstein equation about the relationship between matter and energy has been known for years.

What we are seeing now, engineers say, is a concentrated effort directed toward making practical use of that and other advanced scientific theories. The U.S.S. *Nautilus* was one example of such an effort to translate physical theory into practical reality.

It is no wonder that engineers have chosen "Engineering—Builder of a Brighter Future" as the theme for this year's National Engineers' Week.

CHAMPAIGN COUNTY CHAPTER ENGINEERS' WEEK ACTIVITIES

AT THE ENGINEERS' WEEK DINNER PARTY



Professor and Mrs. J. R. Carroll, Mr. and Mrs. E. R. Healey, and Mr. and Mrs. P. E. Roberts.

JOLIET CHAPTER

In "Joliet Herald-News"

Engineers Vital to Industry

Behind virtually every new product which hits the American market there is a vast amount of engineering know-how which the general public never learns about.

Take the world's largest and most powerful track-type tractor as an example. Some time during this year, the Caterpillar D6—a huge, 30-ton earth-moving monster—will begin rolling off the assembly line at Caterpillar Tractor Company. It represents another engineering feat for the men and women who help build the machines that have been changing the face of the earth for the past fifty years.

A typical engineer is a lot more than an employee in a white shirt sitting at a drawing board. In the case of the D6, it was engineers who tested the pilot models in the company's research laboratory at 65 degrees below zero; it was engineers who traveled with the machines to the hottest part of the desert to see how the new design would withstand the prolonged intense heat.

Engineers at the Company's Joliet plant were also busy, as they began to design many of the tools that attach to the new giant-sized tractor—tools that make the tractor a useful, money-making machine.

What goes into the making of a good engineer? In the

opinion of Roger Smith, Assistant Chief Engineer at Caterpillar's Joliet plant, it is a combination of qualities. "The foremost requirement for which there is no substitute is an understanding of good, sound engineering principles," says Smith, who has interviewed many graduate engineers seeking employment.

Add to this the thoughts passed on by Carl Kepner, Chief Engineer at the Company's Joliet plant. Carl believes that, to be a successful engineer, it is important to have considerable field experience and a knowledge of the entire range of uses to which the product will be put. "And," he reports, "an engineer must recognize the limitations of the available manufacturing techniques, and work with the understanding that what he will create is capable of being built."

To some engineers the end product is a thing of beauty in itself, like the sleek design of streamlined automobiles and modern-day housing. But to the engineers who design construction machinery it's an entirely different thing.

"We don't design and build for beauty," notes Smith. "When that huge tractor gets into the field and begins to construct dams, build highways, create wealth through mining and raise the standard of living of many of our friends in less fortunate countries, that's the real beauty of the machine, as far as we engineers are concerned."

The Story of Some Great Achievements in the Development of Public Water Supplies

W. S. Chevalier, C. B. E.
(Clerk of the Metropolitan Water Board, London)

Man takes water for granted. The general conception that water, like the sun, moon and stars, will always "be there" is an erroneous and dangerous belief. Only when a drought emerges as a serious threat to his well-being does man attempt to understand the seemingly insignificant events that led to the depletion of his water resources. This situation is poignantly illustrated by the severe water supply problems existing in Midwestern and Southwestern United States.

Man's ever-increasing thirst for water creates additional problems. More water is being used in industry, agriculture, and in the home. The picture is further complicated by population increases, especially in areas already hard-pressed for an adequate water supply.

The water problem is not being left alone to run its own course. Specialists in this field are constantly studying and solving water resource problems in an effort to keep mankind supplied with one of Nature's most precious elements. But the work of these men is not enough. It is necessary that everybody be acquainted with the story of water in order to understand fully its effect on civilization. We cannot exist without it. Consequently, we believe that the following article will be read with interest by engineer and layman alike.

In discussing the progress in public water supply during recent times the article emphasizes that which took place in England. Parallel developments were taking place at the same time in this country.

The development of public water supplies has contributed in no small degree to the health and well-being of many millions of people—indeed of whole nations—throughout the world.

It is not possible in a short article to do justice to the many pioneers who, in this field, laboured towards the common goal. In a sense it was a corporate effort, for the engineer, the scientist, the medical man, the surveyor, the administrator, depended to a large extent upon each other for any measure of success attending their efforts.

Even so, the investigations, experiments, and works could not have exerted their full beneficial influence apart from the development of the social conscience of the people.

It has been said that: "The advance in the public health of nations in modern as in ancient times has been dependent upon the social evolution of man more than upon the growing knowledge of science. For progress must always draw its motive and energy from the aspiration and assent of the great mass of the people. The science of the few may indeed both lead and guide the will and habits of the people, but it cannot compel nor can it speedily change their tradition and custom."

Early civilizations were—as, for that matter, are modern communities—largely influenced by the presence or nearness of water, whether for irrigation, transport or health, and settlements grew where natural resources were abundant.

Long before ways and means had been devised of finding underground supplies, of conveying water long distances, or of combating water-borne diseases, Nature was satisfying human wants, although not without some assistance on the part of her water consumers.

Among the water systems of the Ancient World of which traces have survived, those of Egypt and Rome are specially noteworthy.

In Egypt the art of irrigation was, no doubt, from earliest times taught by the natural overflowing of the Nile, and an extensive system of artificial ponds, reservoirs and lakes, with a network of distributing canals, was in existence as early as the second millennium B. C.

Egypt in her turn probably afforded an example to Assyria and Babylon, to Carthage and Phœnicia, and also to Greece and Italy.

* * *

In Imperial Rome the first aqueduct to be constructed was Appia in 312 B. C. and the last Alexandria, A. D. 222-235.

Each such aqueduct delivered its water into water towers, from which proportionate quantities could be

directed to the public fountains, the baths and, as a minor consideration, to private users who paid a water-rate.

Where an aqueduct was constructed to bring water from a neighbouring river it was frequently necessary to dam the river, both to preserve a constant level and to allow settlement of sediment in the resulting reservoir.

Even today there is on the European continent some continuity with this Roman tradition. In Britain, on the other hand, where natural resources were within easy reach and the towns were small, the Romans had no large water works.

* * *

With the waning influence of the Roman Empire, a recession set in which enveloped Europe until about the end of the twelfth century A. D.

As with all generalizations, there were exceptions, notably the monasteries and, perhaps, the residences of the well-to-do.

From about the thirteenth century onwards, however, there was a slow and laborious re-establishment of the art of living in cities.

As time went on, the momentum of this movement increased, particularly under the influence of the Industrial Revolution, and today the provision of an ample supply of pure water is almost taken for granted in many countries.

It would be a fascinating, but a time-consuming study, to examine this development throughout the world. This article is confined to its main features in England, and even more particularly in London, for it was here that many of the problems presented themselves in an acute form.

* * *

As the aggregations of population grew, so the demands for more water increased and supplies previously adequate and safe became inadequate and dangerous.

In many cases water had to be brought from more distant sources either by means of "conduits" which discharged into a covered fountain from which inhabitants could fetch their supplies, or by open "leats" (channels) which conveyed the water through the town, dipping places being provided at intervals where buckets could be filled.

Two notable enterprises deserve specially to be mentioned—the Plymouth Leat and the New River in England. The former, constructed by Sir Francis Drake, was begun in December 1590 and finished in April of the following year.

Although the original purpose for which it was intended was not directly connected with the supply of water to the town, the Leat continued, with little modification, as Plymouth's main source of supply for more than 300 years.

* * *

The New River, constructed by Sir Hugh Myddelton, goldsmith and merchant adventurer of the City of London, was begun in 1609 and was finished, after much difficulty and financial embarrassment, in 1613.

On 29 September of that year the "sweet waters of Hertfordshire," some 20 miles distant as the crow flies but 40 miles along the course of the river, discharged into a Round Pond at New River Head, London, on the site which is now occupied by the Head Offices of the Metropolitan Water Board.

The channel still exists as an important link in London's water system, although its original course has been altered in some places and its length shortened to 24 miles.

The New River is a lasting tribute to the enterprise and engineering skill of Myddelton and his associates. It adds dignity and beauty to the parts of North London through which it flows and certainly provides ample proof, if any is needed, that works of a utilitarian nature need not detract from, and may enhance, the amenities of town or countryside.

A small stone memorial to Myddelton stands near one of the spots from which water was first drawn. Its words, which have an almost symbolic meaning in the context of this article, include the following:

An immortal Work
Since men cannot more nearly
imitate the Diety
Than in bestowing health

* * *

With the growth of urban populations problems of supply, sanitation and health arose which reached a critical zenith by the middle of the nineteenth century. In a famous report on "The State of Large Towns and Populous Districts" issued in 1845, the Commissioners observe:

"It is difficult to estimate with any accuracy the influence produced on the health of the poor from this serious defect; *i.e.*, the scarcity of supplies for domestic use, . . .

"The great moral results consequent upon an increase in the means of cleanliness have not yet, we fear, received the attention which their importance merits; the domestic comfort of a poor man's abode, and his own self-respect, are mainly dependent upon this.

"We are convinced that their neglected condition is by no means the result of choice, although it may be the result of habit, produced by an unfortunate necessity."

And again:

"All medical men unite in opinion of the great advantages that a better supply of water will effect in health of the working classes."

Among the chief contributory factors to the poverty of water supplies was the fact that, with a few notable exceptions, there was no constant service.

In London and elsewhere water was turned on at the conduit head or standpipe in the street during certain hours of the day only, and even that service was not available every day.

While many houses were directly supplied by the

undertakings, practically all the humbler dwellings were without a water supply.

* * *

Meanwhile, engineers were striving to meet the new conditions which had been thrust upon them. Space does not allow us to deal adequately with the new methods of pumping and distribution, the introduction of filtration, and the provision of reservoirs, which have had such a marked effect upon the development of water supplies. But the principal features are to be noted.

With the growth over 350 years of a supply dependent upon pumping, London's water history provides a kaleidoscope of the major developments in pumping machinery. As early as 1712 a Savery engine for "raising water by fire" was installed at the York Buildings waterworks on the site of the present Charing Cross Station but owing to the high cost of fuel its use had to be discontinued. Later a Newcomen engine was installed at the same place.

An atmospheric engine, improved by Smeaton, was constructed at New River Head in 1767. With the invention of the separate condenser by Watt, the way was paved for effcting great economies in fuel consumption and many engines made by the world-famous firm of Boulton and Watt were erected for the London Water Companies between 1780 and 1840.

It is typical of the reliable service of these units that one of them remained in use for more than 100 years.

Cornish engines, compound beams, vertical triple expansion engines have all, in their turn, been utilized. A steam turbine was first installed in London in 1905 since when many such units have been installed.

About the time of the first World War the Diesel (oil) engine became a competitor for smaller load stations and many of this type have been installed. The rapid growth of the public electric supply, however, offered great advantages, and this source of energy is now being increasingly used.

* * *

Means of distribution, too, have changed with the times. When local sources and comparatively small quantities of water only were involved, small pipes of lead or wood sufficed, and people had usually to carry the water to their homes from the street supply-point.

The demands for more water, to be conveyed longer distances, and supplied to consumers at high pressure, found these means wanting. They gradually became obsolete with the invention, about 1785, of the spigot and socket joint which made the use of cast-iron pipes on a large scale a practicable proposition.

Cast-iron pipes were universally used until about 20 years ago but are now being superseded by steel. The last few years have seen the introduction of the asbestos cement pipe, which is being used by a considerable number of water authorities.

Large towns are often dependent upon reservoirs for the maintenance of a full supply of water during drought periods. Although the need for such schemes was felt during the nineteenth century, it has become of even greater importance of recent years with the ever-increasing demands for water.

The early impounding reservoirs were formed by earthen banks with core walls and cut-off trenches of clay puddle. Subsequently masonry was employed.

The Vyrnwy Dam, completed in 1892 to the designs of Hawksley and Deacon was the first example of a large masonry dam to be built in Britain. It was followed by masonry-faced dams with cores of concrete-bound cyclopean rubble, notably those in the Elan and Derwent Valleys.

Later still, on account of the high cost of masonry, concrete alone was employed—as in the Haweswater Dam. The Claerwen Dam has a concrete core and is faced with brick on the upstream side and masonry on the downstream side.

Filtration of river-derived supplies for London was made compulsory in 1852. Its importance remains as one of the foremost purification processes.

Primary (rapid) filters have been used in London since the 1920's originally in order to meet increasing demands for water. The practice has also been adopted by other water authorities.

During the last ten years, self-cleaning micro-strainers for the removal of algae have been introduced. This apparatus has the advantage that the loss of head through it is very much less than for the rapid filter.

On the other hand, measured by the quantity of water filtered per acre cleaned by slow sand beds, the strainers have not yet shown themselves so efficient as the rapid filter, and unlike rapid filters no improvement in chemical quality occurs while the water passes through them.

It is, as yet, early to pronounce judgment on this type of plant, but two installations (combined with slow sand filters) of capacities of 90 million gallons a day and 45 million gallons a day respectively are at present being constructed for the Metropolitan Water Board.

* * *

Until the beginning of the nineteenth century water for public supply was delivered to consumers without any form of purification, except occasionally for slight subsidence in reservoirs.

The first major step in this direction was the introduction in the early 1800's in Glasgow of filtration through beds of sand and gravel, a process which was in use for industrial purposes about the same time. For present purposes, however, the year 1829 may be regarded as the starting point, for it was in that year that James Simpson, Engineer to the Chelsea Water Works Company in London, introduced sand filtration for supplying river water to his Company's area and this paved the way for a method of purification which has continued to this day.

Simpson successfully overcame certain difficulties which had baffled the earlier pioneers and embodied in his filter the fundamental features governing this important process.

These early attempts, however, had for their object simply the clarification of the liquid, that is to say, the

removal of suspended particles visible to the eye. Particles invisible to the naked eye were not thought of.

A process had been instituted whose full results could not be fully anticipated and which awaited the science of bacteriology to bring it to perfection.

Many slow sand filters similar in design to those originally constructed in 1829 still exist, but the tendency in new works is to use rapid mechanical filters in which bacterial removal and clarification are promoted by the use of a chemical coagulant.

* * *

For many years the relationship between an impure water supply and disease was practically unknown. It was believed that contagion was conveyed by the exhalations of the polluted environment, and this no doubt provided the motive a hundred years ago for the construction of drains and sewers before the safeguarding of the water supply.

In the case of London this increased the danger of contamination of the River Thames by the more rapid admission to it of infective material.

What the incidence of water-borne diseases may have been in those days is obscured by the fact that water could be convicted as a causal agent only by circumstantial evidence before the great discoveries of Pasteur, Eberth and Koch between 1857 and 1884, which paved the way to the present knowledge of contagion.

Nevertheless the part played by water in the spread of cholera was established inferentially by Dr. John Snow, a London medical practitioner, who devoted as much of his energy and resources as could be spared from a busy practice to one of the outstanding epidemiological investigations of all time.

True Asiatic cholera first became epidemic in England in 1831-32, and subsequently in 1848-49, 1853-54 and 1866. The first epidemic alone resulted in the recorded loss of many thousands of lives.

Before the epidemic of 1853-54 Snow had studied the records of previous outbreaks and had come to the conclusion that polluted water was the principal agent in the spread of the disease.

Nevertheless, Snow's evidence was not sufficiently convincing to enable him immediately to convert others to his belief. Even such an enlightened sanitarian as Sir John Simon remained incredulous and it was not until 25 years later that he gave official recognition to the "great merit" of the work of Dr. John Snow.

The effect of adequate sand filtration upon the incidence of Asiatic cholera was investigated by Sir Edward Frankland and his son Percy and their observations had far-reaching effects upon purification methods.

From 1882 onwards the science of bacteriology was applied to water in Great Britain and three years later the routine bacteriological examination of London's water supply began.

The present century has seen the improvement and extension of existing filtration processes and the introduction of new and far-reaching methods of water treatment. Chief amongst these were the regular use of water which had been purified by passage through a storage reservoir, chlorination, and the use of primary mechanical filters followed by slow sand filtration.

The storage of water in reservoirs is primarily arranged to ensure a sufficiency of water during times of drought, but the classical researches of Sir Alexander Houston at the beginning of this century revealed that disease-producing and other bacteria present in sewage-polluted water tend to disappear from the water during storage and only a small percentage of these micro-organisms persist after two or three weeks.

Thus storage has become another important stage in the purification of water in that it dilutes impurities and renders the water innocuous in a reasonably short period of time.

The first practical application of chlorination to a public water supply system in England was made in 1897 when water mains at Maidstone were disinfected as an emergency measure following an outbreak of typhoid fever.

A public water supply was first chlorinated regularly in England by Houston and McGowan during an epidemic at Lincoln in 1905 and for several years afterwards.

Chlorination has been one of the greatest advances in water purification and its efficiency in preventing the known water-borne bacterial disases admits of no question. There are today few public water supplies of any magnitude in which chlorination is not normally employed in one form or another.

Soon after the last war a process of free residual chlorination was introduced by the Metropolitan Water Board. It involves the administration of sufficient chlorine to give a predetermined residual of free chlorine after a known period of contact. The process has resulted in an even higher standard of bacterial purity than was previously attained, coupled with a virtual cessation of complaints of taste.

In order to give adequate time for complete sterilization before the water leaves the works, contact tanks are being introduced at all the Board's treatment points. The period of contact varies with the requirements of the individual works.

* * *

It is a matter for regret that this brief outline must perforce pass over other important contributions to the development of water supplies which have been made in many parts of the world.

But much remains to be done. There are vast areas, sometimes with considerable populations, where the provision of the indispensable boon of an abundant and pure supply of water is still not fully attained. Moreover, as modern communities grow and their needs assume new forms, those responsible for water supplies must be ever alert to meet the new conditions.

There is, however, no reason to doubt that the skill, energy and foresight, so amply demonstrated in the past, remain undiminished today, always available in the service of mankind.

A New Development in Transportation

Colonel S. H. Bingham, AUS (Ret.), Executive Director, New York City Transit Authority

There has been much speculation concerning the operation of the conveyor belt shuttle between Grand Central Station and Times Square, New York City. Here is the explanation.

Editor

Before focusing on the subject of our major interest—the conveyor system between Grand Central and Times Square—I would like to take a few minutes to give you a general picture of our New York City Transit System. The Transit System is owned by the City and operated by the New York City Transit Authority under the provisions of the Transit Authority Act of 1953 and a Lease Agreement with the City. It includes all the rapid transit lines in the City, all the surface lines in Brooklyn and Staten Island, about half the surface lines in Queens and five bus lines in Manhattan.

I think very few people—including resident New Yorkers—have any real concept of the tremendous scope of this system. The rapid transit lines alone carried over one and one-half billion passengers last year—three times as many passengers as all the Class I railroads in the United States. The length of rapid transit track is 727 miles—longer than the airline distance from New York to Chicago. During the same period our surface lines carried over one-half billion passengers.

We operate 6,734 passenger cars on the rapid transit lines. Passenger cars on all the Class I railroads in the United States total only three times this number. On our surface lines we operate 2,141 buses and 300 trolley cars and trolley coaches.

The vehicles and the rapid transit structures are what the passenger sees. Behind these operations there are three major rapid transit car repair shops, 13 rapid transit car inspection barns, one of the largest bus repair shops in the world, and 12 bus garages. These shops are equipped to strip a vehicle down to its bare frame, repair or renew any worn or damaged parts, rebuild it, and restore it to service in as good operating condition as new.

Now let us concentrate on the problem of the shuttle. You must keep in mind that the shuttle was not designed originally for its present use. The original subway, which went into operation in 1904, ran north from City Hall up the East Side to Park Avenue and 42nd Street. It continued west under 42nd Street to Broadway, and then turned north up Broadway.

It was inadequate to serve the needs of the city from its inception and new lines were soon constructed. One of these was an extension of the original line, running north from 42nd Street under Lexington Avenue, and is now the East Side Line of our IRT Division. Another line was an extension south from 42nd Street under Seventh Avenue, and is now the West Side Line of our IRT Division. This has been referred to as "completing the H." The shuttle became the "cross bar of the H" connecting the East Side and West Side IRT Lines, with access to the Broadway Line of the BMT Division at Times Square.

Shuttle operation between Grand Central and Times Square, in essentially its present form, began in 1918. As might be expected of any operation nearly 40 years old, it is expensive to operate, inconvenient for passengers, and has long been in need of modernization. In studying this problem I sought a more efficient system of handling the traffic on this very important link of our system.

The shuttle is one of the more heavily used sections of the transit system, carrying over 60,000 people per day in each direction. We now operate 10 cars on three of the four existing tracks between Times Square and Grand Central. The four tracks vary somewhat in length, the average being 2,580 feet.

It is a closed operation permitting the application of an entirely new mode of transportation to the shuttle without affecting any other part of the system. It was my desire to devise a way to carry the passengers within the space occupied by the two center tracks of the four-track route, leaving the outer tracks available for use as walk-ways and air raid shelters.

A conveyor system seemed to offer a possible solution. Its continuous operation offered high capacity in a small space, and the small operating manpower requirements would result in low operating cost.

In the past many passenger conveyor ideas had been suggested and some moving sidewalks and similar schemes actually operated, usually at expositions. Nothing proposed, or in existence, offered any practical solution for the shuttle.

Today we have completely designed, and actually constructed on a small scale, but large enough to carry passengers, a passenger conveyor which I have developed together with the engineers of the Goodyear Tire and Rubber Company and the Stephens-Adamson Manufacturing Company, who have solved many industrial conveyor problems. The contract for the construction and installation of the conveyor equipment has been approved by the Transit Authority and is pending before the Board of Estimate.

The major problems were to develop a passenger conveyor that could accommodate more than 12,000 passengers per hour in each direction with at least present subway standards of safety, would give a speedy, comfortable and convenient ride, would cost less to operate than the present shuttle, and would not cost more than the conventional rehabilitation previously studied for the shuttle. Furthermore, it should be designed to fit into

about half the space occupied by the existing shuttle. The new passenger carveyor under consideration satisfies all of these conditions.

It will carry 16,000 passengers per hour in each direction more safely, and more comfortably, than the present operation. Passengers will make the trip in two minutes, with no waiting for trains. The present shuttle trip is two minutes of running time, plus the waiting time between trains. We estimate that operating and maintenance costs for continuous operation will be about 50% of present shuttle costs. The cost of the conveyor system including the necessary structural changes in the tunnel will be slightly over $5,000,000 which is less than the cost of modernizing the shuttle with conventional subway equipment. The proposed conveyor will occupy only the two center tracks of the shuttle. The remaining two trackways can be converted to well-lighted air raid shelters and walk-ways. Adjoining basements become potential shops that can increase business and tax revenue to the city.

The proposed system differs from previous passenger conveyor proposals in that the passengers will ride in cars carried on belts and on banks of rubber-tired wheels. Conveyor belts are used at low speed for passengers and cars at loading and unloading areas and at high speeds to transport the cars from station to station. Banks of wheels, equipped with rubber tires, moving at different speeds, accelerate and decelerate the cars between stations, and carry the cars around all turns.

Passengers at the stations will walk upon the loading belts which move at a speed of about one and one-half miles an hour. The seven-foot square, ten-seat passenger cars ride on a belt parallel to and moving at the same rate of speed as the passenger loading belt. Nineteen cars pass the loading area every minute.

Passengers step from the loading belt into a car which is empty as it arrives at the loading area and is moving at the same speed as the loading belt. Doors open automatically when the cars reach the loading area and slowly close prior to the time the cars clear the loading area. The passenger loading belt is nine feet wide and sixty feet long. The car-carrying belt is the same length, but only five feet wide. The cars overhang the belt both front and back, and fit snugly against the passenger loading belt. The cars are closely spaced, bumper to bumper, as they pass the loading area.

Once clear of the loading area, the passenger cars are rolled for about 75 feet over a bank of rubber-tired accelerator wheels which quickly step up their speed to 15 miles an hour. The acceleration is at a comfortable rate of two and three-quarters miles per hour per second. Spacing between the cars is increased as they are accelerated and they then ride onto the main line conveyor belt, running at 15 miles an hour. This endless high-speed belt transports the cars on the main run between stations.

At the other station, the passenger cars are slowed down at the same rate in a 75-foot run over a bank of decelerator wheels and are delivered bumper to bumper on a car-carrying belt moving at approximately one and one-half miles an hour. The car doors open and the passengers step out onto a passenger unloading belt moving at one and one-half miles an hour, the same speed as the cars, and walk or ride to the exit at the end of the belt. The unloading belts are the same dimensions as the loading belts.

The empty car is then carried around a loop at the end of the shuttle system on a bank of wheels and deposited on the low-speed belt in the loading area ready to carry passengers. The continuous flow of cars eliminates waiting and platform congestion.

We have designed the system with all master controls concentrated in one room. The operator in this control room will be able to observe all four loading and unloading areas by means of an industrial television system and to start and stop the system. To my knowledge this is the first application of a closed television system to rapid transit operation. The operator will also have control equipment to give him continuous information about the functioning of all essential parts of the entire system.

I first broached this idea to these companies in 1948. It took until 1951 to develop a plan on paper that seemed workable and overcame the hurdles of safe passenger loading and unloading on moving belts, and on means for accelerating and decelerating the cars.

In April of 1953 a working model that proved the feasibility of the design was shown in New York City. During the many months of exhaustive engineering to perfect the conveyor belt subway, full-scale testing equipment to solve human element problems was built.

A rubber conveyor belt sixty feet long and nine feet wide and a mock-up of five full-size cars were set up for human engineering. The cars operated adjacent to the belt duplicating actual loading and unloading conditions on the New York City subway belt system.

An accelerating and decelerating system was built to determine the maximum rate at which a passenger car could be speeded up and slowed down on a conveyor belt system. A model system, to a smaller scale, with one-passenger cars, reproducing all the essential operating conditions of the shuttle system, was constructed and is now in operation in one of the company's plants.

A conveyor system 7,200 feet long with two belt moving in opposite directions and six stations, is under study for a central loop subway in downtown Cincinnati to serve 80 square blocks. It is an excellent means of providing for passenger movement and distribution in a congested downtown area. The cities of São Paulo in Brazil, San Francisco, Boston, and others have shown an active interest in the system.

Similar and simpler passenger conveyor systems are being developed for large parking fields, airports, railroad terminals, stadiums and other locations where great numbers of people have to be moved quickly and at low cost. As you well know, mass transportation systems are

having a difficult time, chiefly as a result of competition from private cars. Increasing use of private automobiles has taken away passengers, and the resulting traffic congestion has slowed down surface traffic to a crawl. Operating expenses have increased, with labor costs taking a greater share of the declining revenues.

Basically there are only two things that must be done to reverse this trend. One, which is to a large extent beyond the control of the transit operator, is to speed traffic in the streets. There are signs that our city planners and officials are beginning to realize that something must be done to control and channel the flood of private cars. Many are coming to the realization that the encouragement of mass transit offers the best hope for the city to accomplish this at the lowest cost.

The other, is for the transit operator to improve his service and efficiency through application of the best modern technology. The conveyor for human transportation is to my mind one of the brightest hopes for progress in this direction. In industry it has been found that lower costs and greater efficiency can be achieved through the substitution of continuous processes for the older batch operations. We must do the same in mass transportation wherever the volume justifies it. The conveyor system I have described, with appropriate modifications to meet local requirements, does precisely this. It is the first radical advance in mass transportation of people in many years, and I am firmly convinced that we will soon see it widely applied.

PROFESSIONAL DIRECTORY

COST OF LIVING INDEX

The cost of living correction factor to be applied to the I.S.P.E. Schedule of Minimum Fees and Salaries is based upon the Consumer Price Index of the 1947-49 average as determined by the Bureau of Labor Statistics. On the 1947-49 base the correction factor for February, 1955 is 114.3.

I hold every man a debtor to his profession; from the which as men of course do seek to receive countenance and profit, so ought they of duty to endeavor themselves by way of amends to be a help and ornament thereunto.

Sir Francis Bacon

Engineering Societies Personnel Service, Inc.

New York Chicago Detroit San Francisco

84 East Randolph Street, Chicago 1, Ill. STate 2-2748

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WELCOME TO A. S. L. E.

Those of us who work for Engineering Societies, Personnel Service, Inc., are very happy to welcome the American Society of Lubrication Engineers into our family of societies sponsoring us. We sincerely hope their affiliation will be long enduring and very satisfactory to all concerned. We cannot perform miracles, but we can honestly try to do all we can to help your members, both employers and employees, try to come up with reasonable solutions of employment problems.

If you have a problem we can help solve, contact our nearest office and they will do all they can for you.

BONNELL H. ALLEN, Manager
Chicago Office

MEN AVAILABLE

Professor. 30. M.Sc. 9 mos. Jr. Scientific and Tech. Asst. on mathematical study of radar scattering. 4 yrs. research asst. on design development, material testing, mech. engrg., and engineering mechanics. $6600. Midwest. 152 PE

Methods. 29. 3½ yrs. estimating and job order control. 2½ yrs. production control, time study, engrg., standards of heating and vent. eqpt. $5400. Midwest. 153 PE

Petr. Engr. 43. M.E. 4 yrs. resp. for infor. concerning lubrication requirements of Ind. Eqpt. 3 yrs. resp. for quality of metal working product. 4 yrs. sales and appl. of lubricants, fuels and other petroleum products. $10,200. Chicago. 154 PE

Sales Mgr. 50. Eighteen yrs. direct sales activities for combustion and chem. engrs. 7 yrs. steam and combustion engr. for steel mill. 5 yrs. operation construction engr. $7000. Midwest. 155 PE

Production Engrg. 41. Gen. Engrg. Degree. 4 yrs. supervision of installation, maintenance, mining, and hoisting of ores. $8000 Midwest. 156 PE

Chemist. 37. Chem. 5½ yrs. authorized purchase of materials, process studies, and recommended solutions for chem. and food plants. Installed statistical quality control. $550. Chicago. 157 PE

Chemist. 26. Chem. 3½ yrs. Control and analytical work, ran organic syntheses, primarily of monomers, amines and organic peroxides, research. $4900. Chicago. 158 PE

Chem. Engr. 46. M.S. Chem. Engrg. 7 yrs. research in chem., ceramic and minerals. 2½ yrs. sales of matl. handling eqpt. 6 yrs. taught chem. engrg. courses. $7500. Midwest. 159 PE

Purchasing. 40. Nine yrs. purchasing of all items necessary for machine manuf. and presses and metal fabrication. 2 yrs. procurement engr. for mfgr. of tractors. $7500. Chicago. 160 PE

Purchasing. 34. Seven yrs. purchased forgings, castings, tools, steam and R.R. machinery. $5000. Chicago. 161 PE

Purchasing. 46. Ten yrs. purchasing of piping, cameras, farm eqpt. and production supplies for these industries. $6500. Midwest. 162 PE

Ind. Mgmt. 41. Chem. Engr. and M.S. Org. and Phy. Chem. 10 yrs. corrosion specialist and metallurgist in stainless steels, aluminum, etc. 9 yrs. supv. of materials of construction, plant problems lab. $10,000. Midwest. 163 PE

Sales Engr. 27. M.E. 2½ yrs. shop and office training. 6 mos. design and layout for jigs, fixtures and dies of ball bearings. 9 mos. job analysis and rate setting in small parts manufacture. $4800. Midwest. 164 PE

POSITIONS AVAILABLE

Sup. Combustion Eng. Test. 2 plus yrs. exp. in combustion engine testing prferably or design and development. Duties: field supervision and writing up reports on 1000 hr. endurance tests of combustion engines. Testing company. Sal.: $350-400. Employer will negotiate fee. Travel; home weekends. Location: Chicago headquarters. C-2821

Sales Engineer. Age: up to 40. No exp. required in sales or engrg. of a light machinery. Recent graduates or better considered. Duties: selling bottling machinery and allied products to breweries, distilleries, wineries and food industries. For a mfger. of packaging machinery. Sal.: $4500-$10,000 plus commission. Employer will pay fee. Travel: 40%. Car required. Location: Chicago, Michigan and Ohio. C-2820

Design & Development. M.E. or Ae.E. 3 plus yrs. exp. in designing and developing airborne eqpt. Duties: designing and developing gas turbine engines; afterburners and controls. For aircraft mfgr. Salary: $6000-$8000. Location: California. C-2806

Research—Heat Transfer. M.E. Ph.D. Age: 26-35. 5 plus yrs. exp. in hydraulic laboratory and design work on eqpt. Duties: research in hydraulic power equipment section heat power department and control problems. For research organization. Salary: $550-$750 per month. Location: Chicago. C-2797

Industrial Engineer. I.E. or M.E. Age: 30-40. 5 plus yrs. exp. in sheet metal fabricating. Duties: setting up program of industrial engrg. and making it operate. For a sings mfger. Salary: $8000-$12,000. Employer will negotiate fee. Location: Ohio. C-2786

Chief Industrial Engr. I.E. or M.E. preferred. Age: 30-40. Six plus yrs. exp. in industrial engrg. on sheet metal products. Know: of M.T.M. and I.B.M. use. Duties: directing department of industrial engrg. covering time studies, standards, incentives, material handling, work flow, etc. For a mfger. of office furniture. Salary: $10,000. Location: Fox River Valley. C-2785

Plant Engr. Age: up to 40. Five plus yrs. exp. as plant engineer in heavy eqpt. and constr. as well as plant layout. Know: power plant operations. Duties: as plant engr. in charge of entire plant engrg. and maintenance. For a mfger. of heavy machy. Salary: $10,000. Employer will negotiate fee. Location: Wisconsin. C-2782

Project Supervisor. M.E. Age: 35-45. Four plus yrs. exp. in shop practices in sheet metal and plat stamping, forming and welding and preferably mufflers. Know: of acoustical theory and practice. Duties: analyses of acoustical theory and practice for mufflers; direction of design and development including production aspects; and contact with customers as a technical representative. For a mfger. of mufflers. Salary: $7200 to $8500 per yr. Location: Minnesota. C-2781

Chief Design Engr. Chem. Eng. Age: 32-45. 6 plus yrs. exp. in over-all designing and over-all operating of chemical metallurgical plts. Know: stainless steel or aluminum. Duties: heading up design dept. as chief engr. developing new ideas in changes of chemical and metallurgical eqpt. in general. For a mfger. of metals. Salary: $8500- $10,000. Employer might neg. fee. Location: Tennessee. C-2778

Asst. Sales Mgr. 3 plus yrs. exp. directing and developing sales of record changers and tape recorders. Know: distributors and industrial sales. Duties: directing and developing sales through appl. and parts distributors or through direct sales to industrials for line of tape recorders and record changers. For mfger. sound equipment. Salary: $8000-$10,000. Location: Chicago area. C-2776

Development. 5 plus yrs. in designing or developing record changers or tape recorders. Duties: developing record changers and tape recorders. For mfger. sound eqpt. Salary: $10,000-$13,000. Location: Chicago area. C-2775